

**REMARKS**

In the Office Action,<sup>1</sup> the Examiner withdrew claims 22-30 from further consideration; rejected claims 16, 17, and 21 under 35 U.S.C. § 102 as anticipated by U.S. Patent No. 5,337,183 to *Rosenblatt*; rejected claims 16 and 21 under 35 U.S.C. § 103 as unpatentable over U.S. Patent No. 6,215,928 to *Friesem* in view of publication "Active Semiconductor-Based Grating Waveguide Structures" to *Dudovich*; and rejected claims 18-20 under 35 U.S.C. § 103 as unpatentable over *Rosenblatt* in view of U.S. Patent Application Publication No. 2003/0012237 to *Tuganov*.

By this response, Applicants have amended claim 16 and added new claims 31-35. Support for the amendment and new claims can be found at least at page 23, lines 6-12, page 16, lines 25-27, page 20, lines 2-3, page 18, lines 3-13, and original claim 8. Accordingly, claims 16-21 and 31-35 remain for consideration on their merits with claims 22-30 withdrawn.

**35 U.S.C. § 102(b)**

Applicants respectfully traverse the rejection of claims 16, 17, and 21 under 35 U.S.C. § 102(b) as being anticipated by *Rosenblatt* as set forth at pages 3-4 of the Office Action. In order to properly establish that *Rosenblatt* anticipates Applicants' claimed invention under 35 U.S.C. § 102, each and every element of each of the claims in issue must be found, either expressly described or under principles of inherency, in that single reference. See M.P.E.P. § 2131, quoting *Verdegaal Bros. v. Union Oil Co. of*

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<sup>1</sup> The Office Action contains a number of statements reflecting characterizations of the related art and the claims. Regardless of whether any such statement is identified herein, Applicant declines to automatically subscribe to any statement or characterization in the Office Action.

*California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Furthermore, “[t]he identical invention must be shown in as complete detail as is contained in the . . . claim.” See M.P.E.P. § 2131, quoting *Richardson v. Suzuki Motor Co.*, 868 F.2d 1126, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989).

*Rosenblatt* does not disclose each and every element of Applicants’ claimed invention. While the Examiner identifies element 60 of Figure 5 as the claimed light transmissive material (Office Action, page 4), *Rosenblatt* does not disclose or teach any “light transmissive material having a selectively variable refractive index to permit tuning of the filter, said light transmissive material comprising a liquid crystal material so as to form a tunable cladding layer for the planar waveguide,” as recited in amended claim 16.

First, *Rosenblatt* does not teach the claimed “light transmissive material having a selectively variable refractive index . . . form[ing] a tunable cladding layer for the planar waveguide.” While the Examiner has alleged that “the electric field . . . applied to the cladding layer [the alleged light transmissive material]. . . means the index of refraction in the cladding layer also changes” (*id.*), this does not anticipate claim 16.

Rather, *Rosenblatt* teaches that the index of refraction of a separate element, i.e., element 59, can be “tuned” via an electromotive force (“EMF”). Col. 9, lines 6-22. *Rosenblatt* teaches that this is due to element 59 being a “lightly doped, high index semiconductor.” Col. 9, lines 9-16; see also col. 9, lines 45-46 (describing element 59 as a “lightly doped n type region high index alloy”). However, element 59 is not arranged “so as to form a tunable cladding layer for the planar waveguide,” as claimed.

In contrast, element 60, the alleged "light transmissive material" of the claims, is a "silicon wafer" that is a "highly doped p type region." Office Action, pages 3 and 4; and *Rosenblatt*, Col. 9, lines 51-52. Element 60 is not a "lightly doped, high index semiconductor." Thus, because of the disparate materials, a person of ordinary skill in the art would recognize that *Rosenblatt* teaches that element 59, and not element 60, is the only layer that is "tunable." Furthermore, the Examiner has not provided any evidence that under the conditions of *Rosenblatt*, that element 60 would respond to EMF in the same manner as element 59 so as to permit "tuning." Nor has the Examiner provided any evidence that the device of *Rosenblatt* would benefit from both elements 59 and 60 being "tunable."<sup>2</sup>

Second, *Rosenblatt* does not include any "light transmissive material comprising one of a liquid crystal material." Instead, *Rosenblatt* teaches that element 60 is a solid material, such as silicon of crystallographic orientation (111), in columns 9 and 10. Neither this, nor any other portion of *Rosenblatt* discloses a "light transmissive material comprising a liquid crystal material," as recited in amended claim 16.

Because *Rosenblatt* does not disclose each and every element recited by amended claim 16, *Rosenblatt* cannot anticipate this claim. Claim 16 is allowable over the art of record. Claims 17-21 and 31-33 are also allowable over *Rosenblatt* at least due to their dependence from claim 16. Applicants respectfully request that the

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<sup>2</sup> The Examiner makes a vague statement that he "also provided further evidence that changing the index of refraction of the cladding layer to tune the device is known." Since this "evidence" is not explicitly identified, Applicants are unable to comment thereon.

Examiner withdraw the rejection of claims 16, 17, and 21 under 35 U.S.C. § 102(b) and allow claims 16-21 and 31-33.

New independent claim 34, though of different scope from claim 16, recites elements similar to those set forth above for claim 16. Claim 34 is therefore allowable for at least the reasons presented above with respect to claim 16. Claim 35 is also allowable at least due its dependence from claim 34.

**35 U.S.C. § 103**

Applicants respectfully traverse the rejection of claims 16 and 18-21 under 35 U.S.C. § 103. No *prima facie* case of obviousness has been established.

To establish a *prima facie* case of obviousness, the Examiner must make findings with respect to all of the claim limitations and must make “some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” See M.P.E.P. §§ 2143.03 and 2141(III), 8th Ed., Rev. 6 (September 2007).

**Claims 16 and 21**

A *prima facie* case of obviousness has not been established with respect to claims 16 and 21 because, among other things, *Friesem* and *Dudovich* do not establish findings for each and every element of Applicants' claims.

Amended claim 16 recites, *inter alia*, “a light transmissive material having a selectively variable refractive index to permit tuning of the filter, said light transmissive material comprising a liquid crystal material so as to form a tunable cladding layer for the planar waveguide.” The Examiner alleges that the substrate element of Figure 2 of *Friesem* establishes a “tunable cladding layer” since “‘a cladding layer’ is any layer [*sic*]

which has a smaller index of refraction than the waveguide layer, wherein the planar waveguide is placed between the diffraction grating and the tunable cladding layer.” Office Action, page 5. Whether or not the Examiner’s characterization of cladding layers is correct, *Friesem* does not establish the “light transmissive material” of the claims.

*Friesem* discloses a cladding layer 26 that is distinct from a substrate 20. Figure 2. Both the cladding layer and the substrate may be formed of “a dielectric, transparent crystal, polymer or semiconductor material.” Column 3, lines 39-41 and Column 4, lines 5-11. A separate waveguide 22 is “formed onto the substrate . . . and may be formed of any suitable material, such as . . . a dielectric, transparent crystal, polymer, liquid crystal or semiconductor material.” Column 3, lines 41-46. Though a liquid crystal material is taught for the waveguide 22 of Figure 2, it is excluded from the list of materials permitted for either of the cladding 26 or substrate 20 layers of *Friesem*. Therefore, the substrate 20 of Figure 2 of *Friesem*, which is on one side of the planar waveguide with the diffraction grating on the other, as claimed, fails to constitute “a light transmissive material having a selectively variable refractive index to permit tuning of the filter, said light transmissive material comprising a liquid crystal material so as to form a tunable cladding layer for the planar waveguide,” as recited in claim 16.

Figure 4 of *Friesem* discloses another configuration having a cladding layer 226 that is distinct from a substrate 220, and a waveguide 222. Here, both the substrate 220 and waveguide 222 are disclosed as alternatives of solid materials (Column 7, lines 58-60) while the cladding 226 can comprise a number of materials, including a liquid crystal material (Column 8, lines 7-11). Again, although a liquid crystal material is

taught for the cladding 226 of Figure 4, it is excluded from the list of materials permitted for either of the waveguide 222 or substrate 220 layers of *Friesem*. Therefore, the substrate 220 of Figure 4 of *Friesem*, which is on one side of the planar waveguide with the diffraction grating on the other, as claimed, fails to constitute “a light transmissive material having a selectively variable refractive index to permit tuning of the filter, said light transmissive material comprising a liquid crystal material so as to form a tunable cladding layer for the planar waveguide,” as recited in claim 16.

Furthermore, the cited prior art and Examiner allegations do not establish supported findings of a “a light transmissive material having a selectively variable refractive index to permit tuning of the filter.” Since the Examiner states that *Friesem* does not disclose that “the index of refraction changes in the cladding layer” (Office Action, page 6), the Examiner relies on *Dudovich* to establish that an “index of refraction changes in [a] cladding layer” for the advantage of “adjust[ing] the wavelength of the laser.” (*Id.*). *Dudovich* merely discloses that the layers of a GWS may be adjusted to change the refractive index. The Examiner does not show how this general allegation is applicable to substrates 20 or 220 of *Friesem*. That is, the Examiner has not made the required “articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” M.P.E.P. § 2141(III).

*Dudovich* teaches that the index of refraction may change in a waveguide layer for the purpose of adjusting the resonance properties of the waveguide layer. Page 1030, col. 2 and Page 1033, col. 2- Page 1034, col. 1. While *Dudovich* teaches bandfilling, plasma, electrooptic, and electrorefractive effects of a multi-layer structure (Page 1032, col. 1, Page 1033, col. 2, and Page 1038, col. 1), *Dudovich* does not teach

adjustments to the refractive indices of the non-waveguide materials to form the claimed “light transmissive material having a selectively variable refractive index to permit tuning of the filter . . . to form a tunable cladding layer.” That is, *Dudovich* uses the combined effects of the layers for the purpose of tuning the waveguide layer of the device, and does not teach or suggest that this is applicable for tuning the cladding layers. *Id.* Therefore, the alleged “light transmissive material” of *Dudovich* is not a “tunable cladding layer,” as claimed. Thus, a person of ordinary skill in the art would recognize that *Dudovich* teaches that the waveguide layer is the only layer that is defined as being tunable. Thus, *Dudovich* cannot provide any motivation to modify *Friesem* to achieve the claimed invention.

Even assuming that the Examiner's allegations are true, which Applicants do not concede, Applicants note that *Dudovich* fails to cure the deficiencies of *Friesem* discussed above. That is, *Dudovich* does not teach, suggest by itself, or motivate the modification of *Friesem* to reach “a light transmissive material having a selectively variable refractive index to permit tuning of the filter, said light transmissive material comprising a liquid crystal material so as to form a tunable cladding layer for the planar waveguide,” as recited in claim 16.

Accordingly, the prior art relied upon fails to establish a *prima facie* case of obviousness with respect to claim 16, at least because the prior art relied upon fails to establish findings with respect to each and every element required by the claim.

Claim 21 depends from claim 16 and is allowable at least for the reason of its dependency. Applicants respectfully request that the Examiner withdraw the rejection under 35 U.S.C. § 103.

New independent claim 34, though of different scope from claim 16, recites elements similar to those set forth above for claim 16. Claim 34 is therefore allowable for at least the reasons presented above with respect to claim 16, and for at least the additional reason that neither *Freisem* nor *Dudovich* teach or suggest a thermo-optical material as claimed. Claim 35 is also allowable at least due its dependence from claim 34.

### **Claims 18-20**

A *prima facie* case of obviousness has not been established with respect to claims 18-20 because, among other things, *Rosenblatt* and *Tuganov* do not establish findings for each and every element of Applicants' claims.

Dependent claims 18-20 include all of the elements of independent claim 16, including, for example a "light transmissive material comprising a liquid crystal material." As set forth above, *Rosenblatt* fails to teach at least this portion of claim 16.

The Examiner alleges that *Tuganov* discloses "a channel-allocation grid element" having "a channel spacing of 50 GHz or 25 GHz." Office action, page 7. Even assuming that this allegation is true, which Applicants do not concede, *Tuganov* fails to cure the deficiencies of *Rosenblatt* discussed above. That is, *Tuganov* does not establish findings of a "light transmissive material comprising a liquid crystal material," as recited in amended claim 16, and required by claims 18-20.

Accordingly, the prior art relied upon fails to establish a *prima facie* case of obviousness with respect to claims 18-20, at least because the prior art relied upon fails to establish findings with respect to each and every element required by the claims.



Applicants respectfully request that the Examiner withdraw the rejections under 35 U.S.C. § 103.

**Conclusion**

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account no. 06-0916.

Respectfully submitted,

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